

CLAIMS:

1. A patient positioning apparatus for use with a patient-support device having a base portion and a patient-support portion which is movable
5 upwardly and downwardly relative to the base portion and which includes a mattress with a sheet thereon, the patient positioning apparatus comprising
a sheet gripper that is coupleable to the sheet,
a first tether that pulls the sheet gripper toward an end of the patient support device in response to the patient-support portion of the bed being raised
10 relative to the base portion, and
a first winder that is spring biased to wrap up at least a portion of the first tether to maintain the first tether taut.
2. The patient positioning apparatus of claim 1, wherein the winder is coupled to the sheet gripper.
- 15 3. The patient positioning apparatus of claim 2, wherein the sheet gripper comprises a housing, at least one hook coupled to the housing, a bar around which the sheet is wrapped prior to the at least one hook being hooked around the bar and the sheet wrapped around the bar, and a second tether coupled to the housing and coupled to the bar.
- 20 4. The patient positioning apparatus of claim 3, wherein the at least one hook comprises a pair of hooks, the bar comprises a pair of opposite end portions around which the pair of hooks are hooked, and the bar comprises an enlarged central portion from which the pair of opposite end portions extend.
5. The patient positioning apparatus of claim 2, further
25 comprising a ratchet assembly coupled to the winder, the ratchet assembly having a latched position in which the winder is permitted to wind in a first direction but is prevented from winding in a second direction which is opposite to the first direction, and the ratchet assembly has an unlatched position in which the winder is permitted to wind in the first and second directions.
- 30 6. The patient positioning apparatus of claim 5, wherein the sheet gripper comprises a housing in which the ratchet assembly and the winder are

-25-

positioned and a handle that is accessible outside the housing and that is movable to move the ratchet assembly between the latched and unlatched positions.

7. The patient positioning apparatus of claim 2, wherein the first tether has a first end and a second end, the first end is coupled to the winder, and the
5 second end is coupled to the base portion of the patient- support device.

8. The patient positioning apparatus of claim 7, wherein the winder winds up the tether when the patient-support portion of the patient-support device is lowered toward the base portion and further comprising means for preventing the tether from unwinding from the winder when the patient-support
10 portion is raised relative to the base portion.

9. The patient positioning apparatus of claim 8, wherein the preventing means comprises a ratchet assembly.

10. The patient positioning apparatus of claim 1, further comprising a second tether and a second winder that maintains the second tether taut,
15 the first tether has a first end coupled to the sheet gripper and a second end coupled to the first winder, and the second tether has a first end to be coupled to the base portion of the patient-support device and a second end to be coupled to the second winder.

11. The patient positioning apparatus of claim 10, further comprising a mount to which both the first and second winders are coupled.

20 12. The patient positioning apparatus of claim 11, wherein the mount is to be coupled to the patient-support portion to be raised and lowered therewith.

13. The patient positioning apparatus of claim 10, further comprising a clutch coupled to the first and second winders, the clutch having an engaged state in which unwinding of the second tether from the second winder due to raising the patient-support portion relative to the base portion results in the first
25 winder winding up the first tether to pull the sheet gripper toward the end of the patient-support portion, and the clutch having a disengaged state in which the first and second winders are decoupled and operate independently.

30 14. The patient positioning apparatus of claim 13, wherein the first winder comprises a first rotatable shaft and the second winder comprises a second rotatable shaft, the clutch comprises a set of gears including a first gear mounted on the first shaft and a second gear fixed to the second shaft to rotate with the second

shaft, the first gear has at least one first lug, the clutch comprises a clutch disc coupled to the first shaft for axial movement therealong between a first position and a second position, the clutch disc is keyed to the first shaft to rotate therewith, the clutch disc has at least one second lug, the second lug engages the at least one first lug
5 when the clutch disc is in the first position so that rotation of the first gear is transmitted to the first shaft through the clutch disc, and the at least one second lug is spaced from the at least one first lug when the clutch is in the disengaged state so that the first gear and first shaft are rotatable independently.

15. The patient positioning apparatus of claim 14, further
10 comprising a handle that is coupled to the clutch that is movable between a first handle position in which the clutch disc is in the first position and a second handle position in which the clutch is in the second position.

16. The patient positioning apparatus of claim 1, wherein the sheet gripper comprises an arm, a roller coupled to the arm, and a ratchet assembly coupled
15 to the arm and to the roller, the ratchet assembly having an engaged state and a disengaged state; when the ratchet assembly is in the engaged state, the roller is permitted to spin relative to the arm in a first direction to allow the sheet to be wrapped around the roller and the roller is prevented by the ratchet assembly from spinning in a second direction opposite to the first direction; and when the ratchet
20 assembly is in the disengaged state the roller is permitted to spin in the first and second directions.

17. The patient positioning apparatus of claim 16, wherein the sheet gripper comprises a manual release that is coupled to the arm and that is engageable to move the ratchet assembly from the engaged state to the disengaged
25 state.

18. A patient-support device comprising:
a base portion,
a patient-support portion movable between a raised position and a
lowered position relative to the base portion,
30 a sheet situated on the patient-support portion,
a patient positioning apparatus comprising a sheet gripper releasably coupleable to the sheet, a tether control unit, a first tether, and a second tether, the tether control unit having a first winder and a second winder, the first tether being

coupled to the sheet gripper and the first winder, the second tether being coupled to the sheet gripper and the base portion, the first winder being spring biased to maintain the first tether taut, and the second winder being spring biased to maintain the second tether taut.

5 19. The patient-support device of claim 18, wherein the patient-support portion comprises a headboard and the tether control unit is coupled to the headboard.

 20. The patient-support device of claim 18, wherein the tether control unit comprises a clutch coupled to the first and second winders, the clutch
10 having an engaged state and a disengaged state, and when the clutch is in the engaged state, unwinding of the second tether from the second winder due to raising of the patient-support portion relative to the base portion results in the second winder winding up the first tether to pull the sheet gripper toward the tether control unit.

 21. A patient positioning apparatus for use with a patient-support
15 device having a base portion and a patient-support portion which is movable upwardly and downwardly relative to the base portion and which includes a mattress with a sheet thereon, the patient positioning apparatus comprising

 a sheet gripper that is coupleable to the sheet,
 a first tether that pulls the sheet gripper toward an end of the patient
20 support device in response to the patient-support portion of the bed being raised relative to the base portion,
 a first winder to wrap up at least a portion of the first tether, and
 a ratchet assembly coupled to the winder, the ratchet assembly having
25 a latched position in which the winder is permitted to wind in a first direction but is prevented from winding in a second direction which is opposite to the first direction and an unlatched position in which the winder is permitted to wind in the first and second directions.

 22. The patient positioning apparatus of claim 21, wherein the sheet gripper comprises a housing in which the ratchet assembly and the winder are
30 positioned and a handle that is accessible outside the housing and that is movable to move the ratchet assembly between the latched and unlatched positions.

 23. A patient positioning apparatus for use with a patient-support device having a base portion and a patient-support portion which is movable

-28-

upwardly and downwardly relative to the base portion and which includes a mattress with a sheet thereon, the patient positioning apparatus comprising

a sheet gripper to be coupled to the sheet,
first and second tethers, and

5 a tether control unit to be mounted to the patient-support portion for movement therewith, the first tether being coupled to the sheet gripper and the tether control unit, the second tether being coupled to the tether control unit and configured to be coupled to the base portion, the tether control unit having a tether coupling mode of operation in which motion of the second tether due to raising of the patient-
10 support portion relative to the base portion causes motion of the first tether to move the sheet gripper toward an end of the patient-support portion and a tether decoupling mode of operation in which motion of the second tether due to lowering of the patient-support portion relative to the base portion does not cause motion of the first tether.

15 24. The patient positioning apparatus of claim 23, wherein the tether control unit comprises a first winder to wind up the first tether, a second winder to wind up the second tether, and a clutch having an engaged state in which the first winder winds up the first tether when the second winder unwinds the second tether due to raising of the patient-support portion relative to the base portion and a
20 disengaged state in which the first winder neither winds nor unwinds the first tether when the second winder winds up the second tether due to lowering of the patient-support portion relative to the base portion.

25 25. The patient positioning apparatus of claim 24, wherein the tether control unit comprises an actuator to move the clutch between its engaged and disengaged states.

26. The patient positioning apparatus of claim 25, wherein the actuator comprises a cam and a cam follower to follow the cam to move the clutch from its engaged state to its disengaged state.